

RECREATION CONFLICT OF RIPARIAN LANDOWNERS WITH PERSONAL WATERCRAFT AND MOTORBOAT USE ALONG THE NEW YORK'S GREAT LAKES

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Abstract: Riparian landowners of the New York's Great Lakes (NYGL) are reportedly in conflict with some motorboat and personal watercraft (PWC) use. Goal interference theory was used to explain landowners' perceived conflict caused by motorboat and PWC use. A study conducted in the NYGL area surveyed the riparian landowners' perceived conflict and problems caused by motorboat and PWC use. Data were collected from six sites: Alexandria Bay, Sandy Pond, Sodus Bay, Olcott Harbor, N. Niagara River, and Handford Bay. Study results showed three of Jacob and Schreyer's four conflict dimensions were determinants of landowners' perceived conflict. Only the resource specificity dimension was not statistically significant in predicting landowners' perceived conflict.

Introduction

Riparian landowners on the New York's Great Lakes (NYGL) reportedly have experienced conflict with personal watercraft (PWC) and motorboat users (Wang & Dawson, 2001). The various types of conflict from PWC and motorboat use include safety, environmental, and unsafe behavior issues. PWC operation has been a safety issue, such as speeding, operating too close to swimmers or facilities, jumping boat wakes, and cutting across the courses of other water craft. Environmental issues can include noise, water pollution, odors, disturbing wildlife habitat, and destroying water plants. With the rapidly increasing use of PWC and motorboats, these problems have become potentially more serious to riparian landowners.

Increased recreation use on water bodies (e.g., rivers or lakes) can result in conflicts between waterfront landowners and other waterfront users. Conflict between riparian landowners and boaters has been the focus of several studies (Adcock, 1999; Dawson et al., 1982; Roggenbuck & Kushman, 1980). Most of these studies compared the landowners' and river visitors' perceptions of river conditions and their different preferences on management actions. Few studies mentioned what social-psychological factors influenced riparian landowners' perceived conflict. Those factors can help resource

managers and researchers to understand how landowners perceive conflict and take management actions or develop educational programs to reduce that conflict.

Compared to general recreational users, such as swimmers, anglers, PWC users, or motorboat users, riparian landowners may have several unique characteristics that cause them to feel conflict differently from participants in other activities. First, in addition to encountering other recreational users when participating in recreation activities, landowners may be disturbed by the noise from a passing motorboat or PWC without direct contact, or by observing a motorboat or PWC operating close to swimmers. Second, unlike recreation users who can substitute or displace their activities, landowners own properties along the water body and are attached to their property for which there is no easy substitution. Third, various attractions of a site, such as recreational activities, scenery, the price of land or geographic characteristics, may attract different types of landowners. For example, because of the numerous islands in the Alexandria Bay Area, watercraft are not only recreation equipment, but also transportation with which local people can go to work or visit friends.

Goal interference theory (Jacob & Schreyer, 1980) has been applied to explain recreation conflict between various recreation users, such as the conflict between cross-country skiers and snowmobilers (Jackson & Wong, 1982), hikers and stock users (Blahna et al., 1995; Watson et al., 1994) and canoeists and motorboaters (Aldelman et al., 1982; Ivy et al., 1992). Goal interference theory proposed four dimensions of conflict factors — activity style, resource specificity, mode of experience, and lifestyle tolerance. Among these four dimensions, lifestyle tolerance is one determinant that consistently predicts recreation conflict. Previous studies usually identified lifestyle based on the recreation activities users participated in, such as PWC users, motorboat users and landowners; however, whether recreation users have ever participated in the activities they encounter may also influence their perceptions of goal interference (Wang & Dawson, 2001). For example, landowners owning a PWC may have different conflict levels than those without a PWC. In addition, landowners from different sites may have different lifestyles causing different conflict levels. Therefore, this study examined if riparian landowners should be categorized based on study sites or watercraft equipment ownership.

The purpose of this paper is twofold. First, the relationships of conflict factors to study site and landowners' ownership of a PWC and/or a motorboat were examined. Second, based on the goal interference theory, this study tested the four important factors for predicting the conflict of NYGL riparian landowners with PWC and motorboat users.

Methods

For this study, New York's Great Lakes area was considered to include the shoreline of the St. Lawrence River, Lake Ontario, the Niagara River and Lake Erie within New York State. Data was collected from six sites

along NYGL with relatively high motorboat and PWC use. The six sites were: Alexandria Bay, Sandy Pond, Sodus Bay, Olcott Harbor, N. Niagara River, and Hanford Bay. Alexandria Bay and Sodus Bay are regional recreation attractions and have heavy recreational use during summer months.

The landowner sample was selected from the tax maps of the six study sites because of the detailed information available, such as: development on the property (e.g., docks, buildings, and land), the owner's name and address, and use type (e.g., home or summer house). The range of each study site extended one mile along the coast from either the mouth of the river or the edge of the bay; the sample range also included those landowners along the bays and rivers. The sample was selected systematically and did not include vacant lands or lands with docks only. About 100 individuals were selected from each study site with a total of 634 landowners selected overall. A mail survey with one initial mailing and two follow-up mailings was conducted in summer, 1999.

The independent variables used in this paper were factors derived from the 10 dimensions containing 94 survey items and reported previously (Wang & Dawson, 2001). The 10 dimensions were: motivation, activity style, resource specificity, lifestyle tolerance, mode of experience,

problem from PWC use, problem from motorboat use, experience, sensitivity to conflict, and expected behavior of PWC and motorboat users. Each dimension contains several factors derived from factor analysis, and each factor contains one or several survey items. The relationships among dimensions, factors and survey items are listed in Table 1.

Respondents were also asked to report their ownership of personal watercraft (PWC) and motorboats. Four different ownership groups could be categorized, including landowners owning a PWC and motorboat, landowners owning a PWC only, landowners owning a motorboat only, and landowners without any PWC or motorboat. Through analysis of variance (ANOVA) with the least square distance (LSD) option, Wang and Dawson (2001) found that landowners owning a PWC and motorboat and landowners owning a PWC could be grouped together because only four items were different. Therefore, the four types of respondents were combined into three study groups based on their ownership similarities (Wang & Dawson 2001). The three study ownership groups were named: landowners owning a motorboat and PWC (L-m-pwc), landowners owning a motorboat only (L-m), and landowners without any PWC or motorboat (L). This study developed perceived conflict models for each of the three study groups.

Table 1. The Relationship among Dimensions, Factors, and Survey Items

Dimension	Factor	# of items	Dimension	Factor	# of items
Motivation	Nature enjoyment	3	Problem from PWC use	Operator behavior & machine impact	6
	Relax, rest & get away	5		Environment problems	4
	Social interaction	4	Problem from Motorboat use	Machine impact problems	3
	Excitement & exercise	2		Environment related problems	4
	Skill & equipment	3		Operator behavior problems	3
Activity	Self-identity	5	Experience	Year	1
Style	Value sharing	4		Importance of land ownership	1
Resource	Place dependence ^a	3	Sensitivity of conflict	Sensitivity to motorboating	1
Specificity	Place identity ^a	8		Sensitivity to PWC	1
Lifestyle	Evaluation of jet skiers	9	Expected behaviors	Positive statements about PWC	3
Tolerance	Evaluation of motorboaters	9		Negative statements about PWC	6
Mode of exp.	Focus on social and the nature	4		Regulations	2

a. Intending to test place attachment theory, this paper renamed factor "Best Place" and "Place Dependence" in the previous paper (Wang & Dawson, 2001) to "Place Dependence" and "Place Identity" respectively in this paper.

Results

A total 634 initial surveys were mailed out, and 37 surveys were undeliverable. After two follow-up mailings, the adjusted response rates for the six sites were between 53% and 77%, with an average of 63% (Table 2).

A two-way contingency table (Table 3) shows that ownership combination were significantly associated with the study sites (Chi-Square=75.889, df=10, and P-value<0.001). Most landowners at Alexandria Bay, Sandy Pond, and Sodus Bay have a motorboat, but only 9%~14% of the landowners at these three do not own any motorboat

Table 2. Mail Survey Response Rates from the Six Study Sites

Study site	Sample	Undelivered	Returned	Response rate
Alexandria Bay	115	8	66	62%
Sandy Pond	114	5	71	65%
Sodus Bay	123	9	88	77%
Olcott Harbor	100	3	51	53%
N. Niagara River	82	4	48	62%
Hanford Bay	100	8	50	54%
Total	634	37	374	63%

or PWC. About half of landowners at Olcott and N. Niagara River do not have a motorboat or PWC, and 6%–8% of the landowners at these two sites own a PWC. Compared to other study sites, Sandy Pond and Hanford Bay have more landowners who own a PWC. These results indicate that whether riparian landowners own a motorboat or a PWC is associated with the characteristics of the study sites.

The relationship between conflict level and study site was examined (Table 4) and Chi-square statistics show landowners' perceived conflict from motorboating is significantly associated with the study sites (Chi-square=21.092; df=5; P-value=0.001). Alexandria Bay has the highest reported conflict level with 48% of landowners feeling conflict from motorboat users. Sandy Pond landowners (14%) reported the least interference from motorboat use.

Interference from PWC use is not significantly associated with the study sites (Chi-square=10.012, df=5, and P-value=0.075). Alexandria Bay has the highest reported conflict level from PWC use (55%) and the N. Niagara River (29%) landowners report the least conflict from PWC use.

Overall (Table 4), riparian landowners at Alexandria Bay reported the highest conflict levels from both PWC use and motorboat use probably because of its highly developed water-based tourism and recreation use. Landowners at Sandy Pond, Sodus Bay, Olcott Harbor, and Hanford Bay reported less interference from motorboat use than from PWC use. One possible reason for this could be spatial

separation of PWC and motorboat use in bays or ponds, where motorboaters need to operate their boats further from the shoreline than PWC users because of the shallow water near shore. However, landowners on the N. Niagara River reported more conflict from motorboat use than from PWC use not only because of the low use level by PWC, but also because high river banks distance landowners from PWC use.

In order to understand how ownership groups and study sites affect conflict factors and landowners' problem perceptions, multiple analysis of variance (MANOVA) was used (Table 5). Results of MANOVA indicate several factors were significant, including the importance of the land ownership, sensitivity to PWC use, two motivation factors, evaluation of PWC users, problems from PWC use, problems from motorboat use, and two of the social value factors about PWCs. For these differences, most affects were caused by ownership groups but not by study site or the interaction between study site and ownership groups. Only the importance of land ownership was affected by study site, and three factors had affects on the interaction between study site and ownership combination, including: importance of land ownership and two of the motivation factors (relax, rest & get away and social interaction). These results indicate that ownership groups were an important variable that influences landowners' perceived conflict caused by PWC and motorboat users, but study site is not so important.

Logistic regression was applied to examine the four Jacob and Schreyer (1980) dimensions of conflict factors that reportedly cause the interference felt by the three groups from PWC use (Table 6). For landowners owning a motorboat and PWC (L-m-pwc), no factor was significant to predict perceived conflict, and most of this group felt no conflict with PWC users. For landowners owning a motorboat (L-m), Self-identity and Lifestyle Tolerance were significant in predicting the perceived conflict. For landowners (L), Lifestyle Tolerance and Focus of Social and the Nature were significant in predicting landowners' perceived conflict. When all landowner types were pooled together, Self-identity, Lifestyle Tolerance, and Focus of Social and the Nature emerged as predictors of landowners' perceived conflict attributed to PWC use.

Comparing the three group models, lifestyle tolerance is the only relatively consistent factor in predicting landowners' perceived conflict. The negative relationship of lifestyle tolerance with perceived conflict indicates that landowners with lower lifestyle tolerance levels reported more interference when encountering a PWC. Self-identity, a factor of the activity style dimension, is only significant in the model of landowners owning a motorboat (L-m). Its positive value indicated landowners with higher self-identity scores reported more conflict with PWC use. Mode of experience is significant in the model of landowners (L), the positive value indicated landowners with higher scores of focusing on the social and natural settings felt more interference from PWC use. Three factors (Value Sharing, Place Dependence, and Place Identity) were not significant to predict landowners' perceived conflict with PWC use.

Table 3. Percent of Each Ownership Group in Each Study Area

Study Sites	Ownership Groups Percent			Total
	L-m-pwc	L-m	L	
Alexandria Bay	16.7	74.2	9.1	100
Sandy Pond	23.9	62.0	14.1	100
Sodus Bay	14.8	75.0	10.2	100
Olcott Harbor	5.9	39.2	54.9	100
N. Niagara River	8.3	41.7	50.0	100
Hanford Bay	22.0	38.0	40.0	100

Table 4. Percent of NYGL Landowners' Reporting Interference from Motorboat and PWC Use

Study sites	Interference from motorboat use		Interference from PWC use	
	No	Yes	No	Yes
Alexandria Bay	52	48	45	55
Sandy Pond	86	14	66	34
Sodus Bay	64	36	55	45
Olcott Harbor	75	25	58	42
N. Niagara River	67	33	71	29
Hanford Bay	76	24	53	47

Table 5. Multiple Analysis of Variance (MANOVA) P-value Test Results for Various Social-psychological Factors (P-values<0.05 are in bold type)

	Corrected Model	Effect from study site	Effect from ownership	Interaction of site and status
Experience				
Year	0.619	0.361	0.628	0.830
Importance of land ownership	0.022	0.008	0.017	0.010
Conflict Sensitivity				
Sensitivity to motorboat use	0.372	0.134	0.980	0.597
Sensitivity to PWC use	<0.001	0.565	<0.001	0.279
Motivation				
Nature enjoyment	0.168	0.085	0.724	0.087
Relax, rest & get away	0.129	0.412	0.060	0.018
Social interaction	0.017	0.794	0.027	0.014
Excitement & exercise	0.364	0.623	0.008	0.777
Skill & equipment	<0.001	0.667	<0.001	0.083
Activity Style				
Self-identity	0.158	0.664	0.148	0.435
Value sharing	0.808	0.726	0.530	0.608
Resource Specificity				
Place dependence	0.610	0.939	0.769	0.447
Place identity	0.319	0.637	0.523	0.117
Lifestyle Tolerance				
Evaluation of jet skiers	<0.001	0.496	<0.001	0.472
Evaluation of motorboaters	0.136	0.076	0.510	0.300
Mode of Experience				
Focus of social and the nature	0.762	0.950	0.394	0.430
Problem from PWC Use				
Operation behavior & machine impact	<0.001	0.659	<0.001	0.193
Environment problems	<0.001	0.973	<0.001	0.257
Problem from Motorboat Use				
Machine impact problems	0.003	0.201	0.062	0.084
Environment related problems	0.005	0.924	0.001	0.568
Operator behavior problems	0.009	0.577	0.039	0.059
Expected Behaviors				
Positive statements about PWC	<0.001	0.666	<0.001	0.278
Negative statements about PWC	<0.001	0.831	<0.001	0.385
Regulations	0.474	0.969	0.170	0.676

Table 6. Regression Coefficients of Significant Variables in Predicting the Landowners' Perceived Conflict Caused by PWC Use

	L-m-pwc	L-m	L	Total
Constant	-1.340	-1.236	-5.882	-3.165
Activity Style				
Self-identity ^a	—	0.843	—	0.428
Value Sharing ^a	—	—	—	—
Resource Specificity				
Place Dependence ^a	—	—	—	—
Place Identity ^a	—	—	—	—
Mode of Experience				
Focus of Social and the Nature ^b	—	—	1.343	0.583
Lifestyle tolerance^c	—	-1.580	-1.279	-1.388
Nagelkerke RS	0.000	0.444	0.458	0.410
Correct prediction (%)	79.2	76.4	78.5	77.7

a. Variables coded on a 5-point scale from "strongly disagree" (-2) to "strongly agree" (2).

b. Variables coded on a 6-point scale from "never focus" (0) to "extremely focused" (5).

c. Variables coded on a 5-point scale from "negative term" (-2) to "positive term" (2).

The conflict factors were used to predict the interference between the three types of riparian landowners and motorboat users (Table 7). The activity style, lifestyle tolerance, and mode of experience dimensions are statistically significant in predicting landowners' perceived conflict attributed to motorboat use. For landowners owning a motorboat and PWC (L-m-pwc), Self-identity and Lifestyle Tolerance are significant in predicting landowners' perceived conflict. For landowners owning a motorboat only (L-m), Lifestyle Tolerance and Focus of Social and the Nature significantly affect landowners' perceived conflict from motorboat use. For landowners without any PWC or motorboat (L), Value Sharing, Lifestyle Tolerance, and Focus of Social and the Nature are significant in predicting landowners' perceived conflict from motorboat use. If all three types of landowners are pooled together, only Lifestyle Tolerance and Focus of Social and the Nature are significant in the perceived conflict model.

Comparing the significant predictors of conflict caused by motorboat use, it was found that lifestyle tolerance with its negative relationship to interference was the only consistent factor across the three landowner groups. Mode of experience was significant in two of the three groups: landowners owning a motorboat (L-m) and landowners (L). In addition, the positive regression coefficients for mode of experience indicate landowners who focus more on the social and natural settings felt more interference from motorboat use. Landowners owning a motorboat and PWC (L-m-pwc) and landowners (L) both are significant in activity style dimension, but in different factors. For landowners owning a motorboat and PWC (L-m-pwc), a positive coefficient for Self-identity indicates those who identify themselves more as landowners feel more interference from motorboat use. However, for landowners (L), Value Sharing had a negative value, indicating landowners who shared their values with others felt less interference from motorboat use. In addition, both factors in the resource specificity dimension, Place Dependence

and Place Identity, do not significantly predict landowners' perceived conflict with motorboat use.

Discussion

Multiple analysis of variance results showed the social-psychological conflict factors and landowners' problem perception were most significantly different in activity status, but not in study site or in the interaction between activity status and study site. This indicated the relationship between social-psychological factors and landowners' perceived conflict. The study site was not an important influence, but ownership groups were important. This also supports previous empirical studies in which conflicted groups were categorized based on the activities respondents participated in, such as hikers versus mountain bikers (Ramthun, 1995) or skiers versus snowboarders (Vaske et al., 2000).

This study applied goal interference theory (Jacob & Schreyer, 1980) to explain riparian landowners' conflict with motorboat and PWC use. Logistic regression results indicate goal interference theory is a good model to explain riparian landowners' interference from PWC and motorboat use. However, only the lifestyle tolerance dimension and the mode of experience dimension are relatively consistent in predicting conflict in both overall models.

Like previous studies (Ivy et al., 1992; Jacob & Schreyer, 1980; Ramthun, 1995), this paper suggests that the lifestyle tolerance dimension is important in predicting landowners' conflict with PWC and motorboat use in NYGL's area. In general, lifestyle tolerance negatively relates to goal interference; indicating visitors more tolerating of the lifestyle of encountered groups will perceive less interference. Although not significant in every model, the mode of experience dimension helps predict recreation conflict, especially, for landowners without any PWC or motorboat, it became an important factor in determining their perceived conflict from PWC and motorboat use.

Table 7. Regression Coefficients of Significant Variables in Landowners' Predicting Conflict Caused by Motorboat Use

	L-m-pwc	L-m	L	Total
Constant	-1.657	-3.033	-5.344	-3.049
Activity Style				
Self-identity ^a	1.175	—	—	—
Value Sharing ^a	—	—	-0.813	—
Resource Specificity				
Place Dependence ^a	—	—	—	—
Place Identity ^a	—	—	—	—
Mode of Experience				
Focus of Social and the Nature ^b	—	0.795	1.363	0.754
Lifestyle Tolerance^c	-1.227	-0.921	-0.733	-0.943
Nagelkerke RS	0.270	0.181	0.346	0.191
Correct prediction (%)	77.4	69.5	76.2	71.7

a. Variables coded on a 5-point scale from "strongly disagree" (-2) to "strongly agree" (2).

b. Variables coded on a 6-point scale from "never focus" (0) to "extremely focused" (5).

c. Variables coded on a 5-point scale from "negative term" (-2) to "positive term" (2).

These results support goal interference theory in which visitors who focus more on their activity in certain ways are more prone to perceive interference. However, the activity style dimension was not consistent in both model sets: PWC conflict models and motorboat conflict models. Self-identity, one factor of the activity style dimension, was only significant in the PWC model of landowners owning a motorboat (L-m) and in the motorboat model of landowners owning a motorboat and PWC (L-m-pwc). Value sharing, another factor of the activity style dimension, was only significant in the PWC model of landowners without any motorboat or PWC (L). Therefore, this study did not support activity style as a strong determinant of recreation conflict.

The resource specificity dimension proposed by goal interference theory is not a significant determinant in both model sets. The resource specificity dimension corresponds to two factors, Place Dependence and Place Identity. Neither of these two factors were significant in any model. These results do not support goal interference theory and other empirical studies (Adelman et al., 1982; Vaske et al., 2000). Resource specificity is not a useful determinant of landowners' perceived conflict perhaps because most landowners thought their property and the NYGL area was so important to their daily life they reported high values for these two factors. Therefore, these two factors were more like constants among landowners.

Comparing the two conflict model sets -- PWC conflict models and motorboat conflict models -- it was found that landowners' experience with the activity they encountered would affect the prediction ability of goal interference theory. In the PWC conflict model, for instance, the six conflict factors explain the least variation in the perceived conflict model for landowners owning a motorboat and PWC (L-m-pwc). Similarly, in the motorboat conflict model, the six factors explain very little of the variation in perceived conflict for landowners with a motorboat (L-m). Goal interference theory best explains conflict for landowners without any motorboat or PWC (L) in both models. This suggests that landowners without experience with the activity they encountered had more crystallized norms and had a clear pattern in perceiving conflict from motorboat and PWC use. These results are supported by a similar idea from previous studies (Vaske et al., 2000) in which goal interference theory could better explain out-group conflict, but not in-group conflict.

Goal interference theory (Jacob & Schreyer, 1980) can help explain landowners' conflict with motorboat and personal watercraft use. However, only mode of experience and lifestyle tolerance were relatively consistent factors in predicting landowner's interference. Resource specificity is not a determinant in predicting landowners' perceived conflict with PWC and motorboat use. The results of the study suggest that recreation conflict is more complex than past studies found, as equipment and visitors' experiences can affect their perceived conflict.

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